

## Hill not the source of contamination in South Weber well

According to a report issued by the Air Force, oil found in a South Weber drinking water supply well was most likely caused by a damaged pump motor, not by contamination from Hill AFB.

The report is the result of a 12-month investigation launched by the Air Force following the contamination of South Weber Well #2 (SW2), a drinking water well that supplies water to South Weber residents.

Base officials were particularly concerned because SW2 lies within a plume of contaminated groundwater coming from the base. Although contaminants from the base were not believed to be in the deep drinking water aquifers, the Air Force wanted to be sure.

The first step was to test the contaminated water from the well and see if it had anything in common with water contaminated by the base.

Most of the contaminants from the base are solvents and fuels and are found in the shallow aquifer. While no solvents were found in the samples from SW2, a chemical analysis did show petroleum contamination. To ensure the petroleum contamination from the base had not contaminated the drinking water aquifer, a second phase of the study was un-



South Weber Well #2, shown here in the background, has operated since 1964. Air Force monitoring wells, located beneath the concrete pad in the foreground, showed the contamination was not connected to Hill AFB.


dertaken.

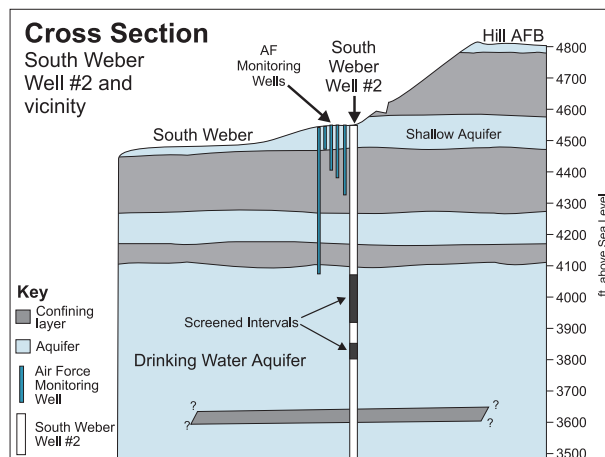
As part of the study, the Air Force installed five monitoring wells near SW2. Each well tested water from different depths, including the depth at which SW2 draws it water. The wells revealed no surprises. Most importantly, the water sample taken from the same depth as SW2 was clean.

With this information, the Air Force felt that whatever was in the well, was not coming from the base. The question now was if the contamination wasn't from the base, where was it from?

Investigators suspected a damaged submersible pump may have been the source of the oil. Submersible pumps are placed down in the well, under the water and pump water up the well to the surface. If these pumps fail, they could leak a food-grade oil into the water and actually pump oil-contaminated water through the distribution system. This is most likely what happened when the submersible pump at SW2 failed in September 1996.

The well is currently off-line, pending further investigation by the Weber Basin Water Conservancy District, which owns SW2.

For more information regarding SW2, contact Scott Paxman at Weber Basin at 771-1677. For more information about the Air Force report, contact Kevin Bourne at 775-6892. 



### About Operable Unit 1

OU-1 is located on the Northeast side of Hill AFB. It consists of landfills, chemical disposal pits and fire training areas. Chemicals have contaminated groundwater on base, which has moved off base into the community of South Weber. Public drinking water supplies have not been affected by chemicals from the base.

### Cleanup actions

Last year, Hill AFB proposed a cleanup plan for OU-1. This included a series of extraction wells placed at the base boundary, which will contain nearly all remaining contamination on the base. Off-base contamination will be allowed to break down naturally, but will be closely monitored to ensure the natural processes are working as expected.

### South Weber Well #2

This well draws water from the Sunset Aquifer, about 450 feet underground. It is separated from the contaminated water by more than 100 feet of clay.

## CERCLA

The Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA, was passed by congress in 1980. The law outlines in detail how hazardous waste sites are to be cleaned up.

CERCLA was amended in 1986.

## Cleanup decisions

Deciding how to clean up a site is no easy decision. The time required to review all the investigations, reports, studies and tests can add up to several years. With all that time and money invested, it's no wonder, then, why cleanup decisions are firm, once they are made final.

## Provisions for uncertainty

Since no plan is perfect, CERCLA requires cleanup systems to be carefully reviewed after five years. If the system is not working as planned, the Air Force must present a revised plan to regulators and the public for their review.

# Uncertainty of cleanups

It may be cliché, but when dealing with environmental cleanups it's true: the only thing that stays the same is that things change.

Changes can take many different forms. For example, new information about a site can shift the focus of the cleanup effort. New technologies may make existing methods of cleanup obsolete. An increase or decrease in funding can also cause changes in the way cleanups are managed.

While conditions at all of Hill AFB's cleanup sites have changed to some degree, nowhere else has change impacted a site more than at Operable Unit 2, on the base's northeast side.

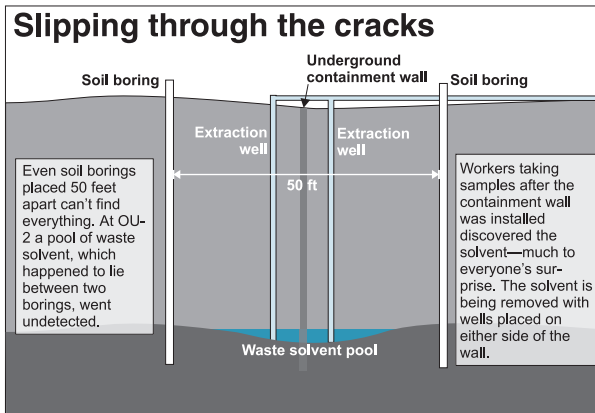
Operable Unit 2, a former chemical disposal pit, is arguably one of the most investigated sites at Hill, if not in the entire Air Force. But despite all the investigative work done at the site in the last 15 years, a large underground pool of waste solvent went undiscovered until last year. Workers doing site characterization in the area discovered the contamination while doing hydropunch sampling.

"We were shocked," said Steve Hicken, OU-2 project manager. "We had sampled the area extensively and thought we had found the outer boundaries of the contamination. We just missed it."

Hicken said groundwater samples were taken in the area at 50-foot intervals, typical in these types of



Groundwater sampling is an important part of any environmental investigation. The data collected helps engineers and hydrogeologists determine what is in the groundwater and in what direction it's moving.



investigations. The solvent pool was nestled between two of the sampling points. "It was a fluke," he said.

This case illustrates just how complex environmental investigations can become.

"Environmental investigations are difficult because we can't see what's below the ground surface where the contamination is found," said Bob Elliott, Chief of Hill's Restoration Division. "As a result, we use boreholes, soil samples and groundwater monitoring wells to determine if contamination is present."

Elliott said scientists must use the information from these small, distinct sampling points to predict the conditions of the entire area.

Geologists know that the more sampling points they have, the more accurate their description will be. A more accurate description means fewer surprises later on. (For a more detailed example, see *Geology Exercise* on page 6.)

This "more is better" philosophy is the basis of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the law which drives cleanup at Superfund sites, like Hill. CERCLA requires a thorough investigation of the site before a cleanup plan is chosen. By learning as much about a site as is reasonably possible, regulators hope to avoid last-minute surprises, like the one at OU-2.

Adding to the complexity of site investigation is the ever-changing character of the environment. Since groundwater moves, information about a site that was true four or five years ago may be different today.

Elliott said that while the conditions observed at a site may change over time, changes are not usually dramatic. "What we see as changes, are more due to our improved understanding of the site, not neces-

# CleanUpdate

*Cleanup news from the communities surrounding Hill AFB.*

## East Area South Weber

OU-1  
OU-2  
OU-4

The Air Force has responded to comments on the OU-1 Proposed Plan. The Record of Decision was signed Sept. 29. The design of the dewatering trenches and rebuilding the caps at the source area will

begin shortly thereafter.

At OU-2, a contract to extend the groundwater interception trench along the north side of the site was awarded to Westinghouse. Construction began in September and will be completed in November. Additional studies will be done to determine how much waste solvent remains in the ground. In one study, Rice University researchers plan to use seismic waves to locate underground pools of waste solvents.

Cleanup work continues at OU-4. The horizontal drains are removing and treating about 400,000 gallons per month of contaminated groundwater. Phase III of the system is currently being designed. This phase will include a deep extraction trench system that will remove contaminated water from the most contaminated areas of the site.

## North Area Riverdale

OU-6

The construction contract for the on-base extraction and treatment system was awarded to Westinghouse. This system will be built on the north side of the base along the base boundary. Construction activities are planned to begin in November 1998. The off-base pump-and-treat system continues to operate smoothly. The most recent monitoring well samples show TCE concentrations in the subdivision are declining significantly.

## West Area

Sunset, Clinton

OU-5  
OU-9

Engineers are currently investigating a newly discovered area of contamination east of the Tooele Army Rail Shop. They want to know if this contamination is connected to what has already been

discovered, or if it is a separate plume. As a result, the Feasibility Study and Proposed Plan for cleaning up the site have been delayed until February 2000. Engineers should know more about the plumes and their sources by next spring. Meanwhile, the aeration curtain and groundwater extraction systems in Sunset will continue to operate.

## South Area Layton

OU-8

The Interim Remedial Action near the base's South Gate was brought on-line in May. The groundwater containment system runs along the southern base boundary. It consists of eight

groundwater extraction wells that will remove contaminated groundwater before it can leave the base. This will prevent additional contaminated groundwater from leaving the base and flowing into Layton. Well vaults on the east side of the system flooded in June and have been shut down for repair. Despite the shutdown, the remaining wells are still able to contain the contaminated groundwater on base. Repairs should be completed by November and the entire system will be brought back on-line.

The Remedial Investigation at OU-8 continues. Using cone penetrometer and hydropunch techniques, extensive soil and groundwater data were collected in Layton this summer. This fall, additional groundwater monitoring wells will be permanently installed in Layton.

## On-base Area Hill AFB

OU-3  
OU-7  
OU-9

Cleanup work at OU-7 in the base's industrial area is coming to a close. In July, regulators conducted the final Remedial Action inspection. The Air Force submitted its Remedial Action close-out report

in August. Monitoring will continue at the site to ensure the installed Remedial Actions are operating as designed.

At OU-3, the Air Force is preparing to shut down the soil vapor extraction system at Bldg. 514, which has been operating since September 1997. Confirmation sampling will determine if the SVE system has removed the contamination that was found beneath the building.

The caps at Berman Pond and the sodium hydroxide tank spill site, part of OU-3, went through their annual inspections in August. No major defects were found at the Berman Pond cap. The report for the sodium hydroxide tank site is not yet complete. The cap at Bldg. 225 (part of OU-7) was inspected in July. Most of the defects observed consisted of minor cracks in the joints of the concrete floor of Bldg. 225. They will be repaired, if necessary.

Work plans have been submitted to clean up PCB-contaminated soil at three sites located on the north side of the base. That work is expected to be completed soon.

**If you have any questions, or would like more information regarding the cleanup work at Hill AFB, please contact one of the people listed here.**

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# Riverdale Cleanup: First step a success

When Hill AFB environmental engineers proposed a cleanup system for the Craigdale subdivision in 1995, they could only hope the system would work as designed. Today, their hopes have been realized.

The network of groundwater extraction wells installed beneath two Craigdale streets are working quite nicely, extracting and treating contaminated underground water moving from the base slowly down the hillside. In fact, the system is working so well, engineers are beginning to see the area of contamination showing signs of shrinking.

"We haven't seen the plume actually shrink," said Steve Hicken, who manages the Craigdale cleanup project for the base, "but we are seeing a dramatic reduction in concentrations of contaminants at several monitoring wells in the area."

Since September 1996, the system of six extraction wells has pumped and treated more than 13 million gallons of groundwater.

But Hicken said the action of pumping and treating the water is not enough by itself to clean up the groundwater in Riverdale.



Wells installed in and along the streets in the Craigdale subdivision of Riverdale, like this one on 1200 West, have been doing their job. Hill environmental officials report that contaminant levels in the groundwater are dropping.

"The key to cleaning up the area is to first take care of the source," he said.

## The source

Investigations have identified the source as a small area on the north side of the base, in a munitions storage area. What caused the contamination is not known, but experts think there are several possibilities ranging from an accidental spill of solvent, to a worker carelessly dumping a bucket of waste solvent out a back door.

Regardless of how it happened, the solvent seeped into the ground eventually reaching the water table, which is nearly 100 feet deep in that area. Once in the water, the solvents slowly spread to cover the area we know today.


Unfortunately, source areas will continue to feed a groundwater plume until they are cleaned up or cut off from the rest of the plume.

## Future cleanup plans

Hicken said the Craigdale wells were only the first step in the overall cleanup strategy for the site. A plan to clean up the entire site, including the source area, was presented to Riverdale residents last year. According to the plan, another system of extraction wells will be installed near the base boundary. These wells will be placed directly in the contaminated area and will prevent contaminated groundwater from leaving the base. Once cut off from its source, the off-base area of contaminated water should begin to shrink rather quickly.

He also said the wells in Craigdale will continue to operate until contaminant levels have reduced to the point that pumping is no longer required.

In the next year, Hicken said he expects to see further reductions in the concentrations of contaminants found in the groundwater. As the on-base containment system goes into operation, he said he expects to see even more improvement. Within five years, Hicken said he hopes to be able to shut down the wells along the outermost part of the plume (along 1150 West).

Hicken said he hopes each step toward cleanup will be as successful as the first. As a result, Craigdale residents can look forward to a cleaner future. 

## About Operable Unit 6

OU-6 consists of areas on the North side of the base, adjacent to the city of Riverdale. Contaminated groundwater has moved off base into the Craigdale subdivision. Drinking water supplies have not been affected.

The primary contaminant is trichloroethene (TCE), a degreasing solvent commonly used at Hill AFB until the mid-1970s.

## A little goes a long way

Engineers estimate the total amount of TCE in the groundwater at OU-6 to be about five gallons. That five gallons has contaminated more than 66 million gallons of water.

## A fortunate find

The plume associated with OU-6 was actually found by accident. In 1990, researchers taking background samples for an investigation at nearby OU-4 unexpectedly found contaminants in one of the samples. Further investigations revealed a small cigar-shaped plume extending from the north side of the base into Craigdale. While the contamination would have surely been found later, this fortuitous find gave engineers a four- or five-year head start on the cleanup.

### Range facts:

The range began operations in 1937 as an Army training facility. In 1979, it became officially known as the Utah Test and Training Range (UTTR).

While the UTTR covers nearly 1 million acres, Hill AFB manages nearly 9 million acres of government land in Utah's West Desert.

15,999 sorties were flown in fiscal year 1997.

### About the people

Approximately 4,300 people live in the areas surrounding the UTTR.

Nearly 40 percent of the work force are employed by either the federal, state or local governments.

About five percent work in agriculture.

### New discovery

Marcus Blood, Hill's natural resource manager, recently discovered a new species of grass on Air Force property.

### Abundant wildlife

The UTTR is a haven for many species of animals and plants, including 25 threatened or endangered animals and 24 threatened or endangered plant species.

## Range Roving: Meeting with our West Desert neighbors

To those living in Utah's West Desert, environmental issues often take center stage. These issues range from preserving cultural artifacts to aircraft noise.

Because the Air Force is an important player in western Utah's environment, Air Force representatives recently visited the small rural communities to discuss issues related to the Utah Test and Training Range (UTTR) and other Air Force-related topics.

The group included representatives from the 388<sup>th</sup> and 419<sup>th</sup> Fighter Wings, the 299<sup>th</sup> Range Control Squadron and Hill's Environmental Management Directorate.

The "Moses Trek," as it has been nicknamed, began in Wendover, Nev. Other stops included the desert communities of Montello, Nev., and Ibapah and Callao, Utah. The trekkers ended their tour in Tooele and Grantsville. In all, the tour took three days and covered more than 550 miles.

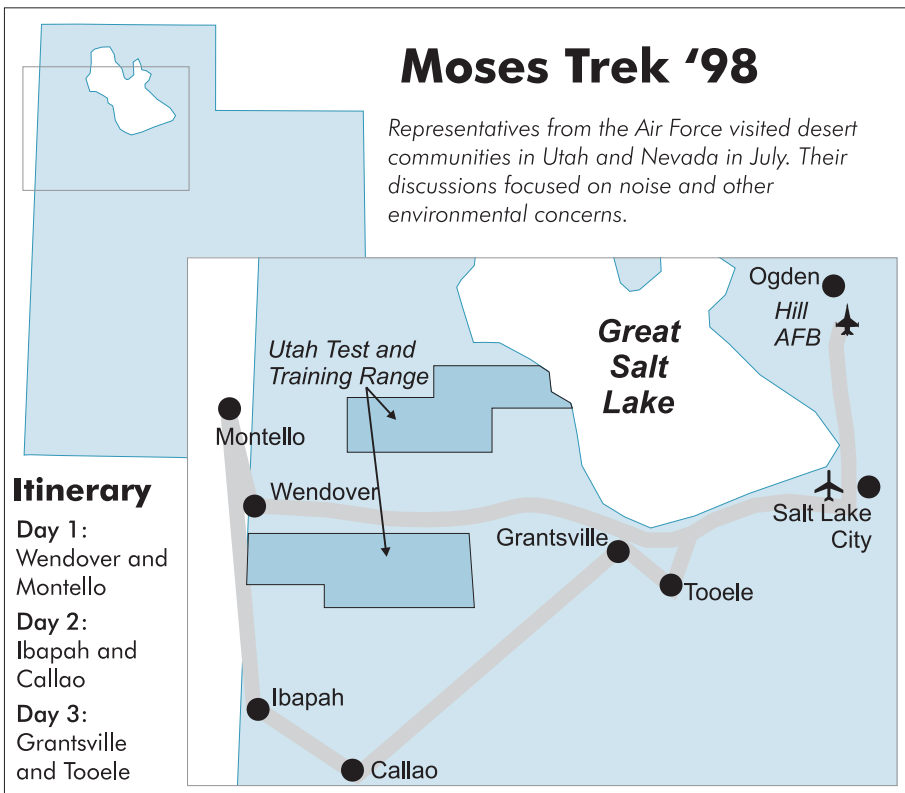
"We had a tremendous response. The people were very appreciative of our visit," said Environmental Public Affairs Coordinator, Charles Freeman, the base's environmental representative on the trip. "We want to show the people we are concerned about them and the base's impact on their lives."

As would be expected, aircraft noise was the issue of greatest concern, but not the only issue. According to Freeman, the people are concerned about other environmental issues, as well.

"They said they wanted to be kept informed of any cleanup work being done in the area," Freeman said, "especially if that meant hazardous chemicals would be transported through their communities."

### Moses Trek '98

Representatives from the Air Force visited desert communities in Utah and Nevada in July. Their discussions focused on noise and other environmental concerns.



Freeman said one of the purposes of the trip was to gauge interest in forming a Restoration Advisory Board (RAB) for the area.

"The people expressed no interest in forming a RAB," Freeman said. "However, they want us to keep coming out to provide updates."

Freeman is currently in the process of developing an environmental community relations plan for the UTTR and surrounding areas. This trip was his first chance to meet face-to-face with those who are the focus of the plan and discuss directly the issues facing them.

"This gave me an excellent opportunity to see firsthand how the people live, what they do and what's important to them," Freeman said. "What I have learned on this trip will be a big help as we put together this Community Relations Plan."

Freeman said the Air Force will continue its efforts to be a good neighbor. He said that representatives from the UTTR visit the desert communities regularly, but he said he would like to see Hill send representatives at least once a year. 🌐

## Uncertainty of Cleanups *continued from page 2*

### Geology exercise

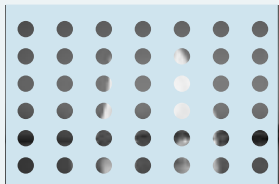
For a geologist, seeing what's underground is like placing a piece of paper over a photograph. Punching holes in the paper is much like a well or soil boring—they only show a small piece of the total picture.

With a few holes punched in the paper, you can see there's something under the paper, but beyond that, not much.



When first investigating an area, geologists will use just a few wells or borings to determine if an area warrants further investigation.

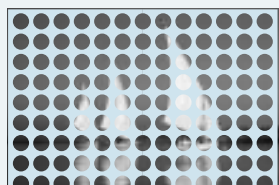
Add a few more holes placed in a grid pattern, and you begin to see a picture take shape beneath the paper.



If geologists find something in their initial investigation, they will take additional samples. This will give them a clearer picture of what is underground.

Of course, more holes means more of the picture is visible.

Geologists want to take as many samples as possible. But since wells and borings are expensive and take a lot of time, geologists usually make do with far fewer holes than they would like.



sarily any significant change in site conditions," he said. "As we refine our understanding, we make adjustments to the cleanup systems, such as increasing the amount of water we pump. This keeps the systems working as efficiently as possible."

To account for changes in site conditions—both actual and observed—CERCLA requires a regular review of cleanup systems. Five years after cleanup operations begin, every system must go through a thorough review to ensure it is functioning as intended. Based on their findings, the regulators can recommend changes to the system. The reviews are repeated every five years until the site is cleaned up.

Elliott believes these reviews are important to the success of the cleanup program. "We continually evaluate the effectiveness of the cleanup systems we have in place. Our evaluations are compared to the cleanup objectives and goals we set with the regulatory agencies. It's important for us to formalize these evaluations for the regulators, the public and our other stakeholders," he said.

The Source Recovery System at OU-2 has completed its first five-year review. According to Elliott, the results were positive.

"The five-year review found that all areas of the treatment system are in compliance with the requirements outlined in the Record of Decision," he said.

He added that although the report recommended some minor changes in the operation and maintenance of the system to improve efficiency, the system continues to effectively protect public health and the environment. 🌍

EnviroNews is a quarterly publication of the Environmental Management Directorate, Hill AFB, UT, designed to inform the public of hazardous waste cleanup and other environmental activities at Hill AFB.

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